

Design and Construction Notes for Aesthetic Barriers

Stone Masonry Guardwall

1. The stone masonry guardwall has been crash tested and meets the requirements of NCHRP Report 230. This rough-faced barrier system is approved for design speed of 100 km/h or less. A smooth-faced wall with smaller projections and shallower raked joints and beds is also approved.
2. The crash tested rough stone masonry guardwall used specifications that defined the maximum projections up to 38 mm beyond the neat line, 50 mm deep raked joints, and beds 50-75 mm thick. Based on aesthetics and available stone, specifications for the guardwall may be revised to specify any smoother stone face, such as class A or B masonry. Stone faces with critical dimensions greater than those listed above are not considered crashworthy.
3. Numerous designs for the stone masonry guardwall and its terminals have been reviewed and tested during the development of this system. One of the critical dimensions is the 500 mm between the ground line and the top of the corewall. Federal Lands Highway Standard Drawings for berms, turn-down terminals, and back-slope anchored terminals reflect the best compromise of safety, aesthetics, and ease of construction. Prior designs are not to be used. Due to the possible effect on the crashworthiness of the guardwall, any modifications to Federal Lands Highway Standards for the stone masonry guardwall must be approved by the Federal Lands Highway Office.
4. The grading in front of the guardwall and terminals must be at a slope of 1:10 or flatter for the guardwall to be effective.
5. The maximum dynamic deflection of the stone masonry guardwall is 0 m for design speeds of 100 km/h or less.
6. During construction, care should be taken to avoid large rock projections oriented toward oncoming traffic. Such projections have a tendency to snag a vehicle resulting in greater vehicle and occupant injury. The recommended orientation for the projections is away from oncoming traffic, so that the vehicle can ride over the projections.

EXHIBIT 8.3

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Stone Masonry Guardwall (Continued)

7. No stone masonry guardwall terminals have been crash tested. The Federal Lands Highway Office has standard drawings designed specifically for the stone masonry guardwall for a berm Buried terminal (BT), a back-slope anchored terminal (BAT), and a stand alone terminal (SAT) (turn-down), and may be used:
 - a. Where there is adequate room, the preferred terminal is the buried terminal (BT) with an earth berm. The terminal section should be located outside the clear zone, but if this is impractical it should be flared as far from the roadway as possible. The earth berm should be oriented approximately parallel to the roadway. It is intended that each berm will be stacked to fit its particular location. For safety, aesthetics, and maintenance considerations, it is desirable to flatten the slopes of the berm as much as possible. A 1:3 sideslope on the berm facing the roadway is considered minimally acceptable. It is also desirable to increase the height of the berm, but the 1:20 approach slope must be maintained.
 - b. Where there is a back-slope to tie to, the preferred terminal is the back-slope anchored terminal (BAT). Special consideration will be needed to maintain drainage, because this terminal will not accommodate a drainage ditch.
 - c. Where it is not possible to construct an earth berm or tie to a backslope, the guardrail may be terminated using the SAT. Crash tests on similar turn-down designs have demonstrated the potential for this type terminal to launch a vehicle or produce a rollover. However, this terminal is superior to leaving the exposed guardrail end that could snag or even penetrate a vehicle. The widened shoulder area and guardrail flare aids is providing stability for a vehicle riding up on the terminal.

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